

## SOME RARELY COLLECTED MEXICAN BRICKELLIAS

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WHILE collecting<sup>1</sup> in Michoacan, chiefly around Morelia, and in Jalisco, in the environs of Guadalajara, the writer obtained *Brickellia oliganthes* (Less.) Gray at the base of Mt. Punguato at Morelia and *B. verbenacea* (Greene) Robinson in a little arroyo, near Las Tortugas River on the road to Tequila, about thirty-eight kilometers from Guadalajara. These two closely related species respectively precede and follow *B. reticulata* (DC.) Gray in the Subsection *Reticulatae* of Section *Bulbostylis* in Robinson's monograph of the genus (Mem. Gray Herb. I. 52, 1917). Both have coriaceous and at least partially serrate leaves, the former with short pubescence above and below and the latter scabrous on the margin and slightly so along the veins on the upper side but appearing almost equally green on both sides. The two species are separated in the key on the basis of pedicellate heads in the former and sessile in the latter. *B. verbenacea* is further distinguished by acute rather than mucronate outermost involucre bracts. As there is some variation in the disposition of heads of the inflorescences on larger and smaller stems of one plant, it is difficult to sharply delimit either species by this character. In both, the herbaceous stems arose from a thickened woody caudex.

When returning to Cuernavaca from Jautepec in Morelos, on November 3, 1950, about twenty-three kilometers from the city limits, a single plant<sup>2</sup> which is definitely of this subsection was seen almost hanging over the road from the adjacent mountain side. It was not only gray in appearance as a result of dust from the roadside, but a heavy indumentum covered the stem and both surfaces of the leaves. There were about fifteen stems, of which at least twelve bore some heads, arising from a thick woody base to a height of 7 to 9 dm. While the basal leaves were missing, the internodes were only 1 cm. long, making the stems appear very leafy from the distance of 10 cm. upwards to the base of the

<sup>1</sup> The author gratefully acknowledges a grant from the Penrose Fund of The American Philosophical Society which made possible collection of cytological material as well as herbarium specimens in Mexico.

<sup>2</sup> Specimens of this plant will be deposited at the Gray Herbarium, U. S. National Herbarium, and the Instituto de Biología, Mexico City.

inflorescence. The lowest leaves were oval, 5 cm. long, 1.5 cm. wide, and almost entire with but very slight serrations toward the apex. The chief inflorescences were corymbs of numerous heads on bracteolate pedicels though the lesser branches bore loose racemes of correspondingly fewer heads on shorter pedicels. The similarity to the figure of *B. reticulata* (DC.) Gray in Robinson, page 52, certainly is striking.

DeCandolle (Prodr. VII. 268, 1836) described the species *Bulbostylis reticulata*, from a specimen collected by Haenke in Mexico without exact locality, as suffrutescent, much branched and entirely tomentose, with almost opposite oval-oblong entire leaves, distinctly reticulate below and with heads axillary and pedicellate, forming leafy racemes. When Gray transferred this to *Brickellia* (Pl. Wright. I. 84, 1852) he suggested, as he stated "after barely having seen it in the herbarium of DeCandolle" that it might possibly be the same as *B. oliganthes* (Less.) Gray, but the latter had narrower serrated leaves and a naked inflorescence. At the time Robinson wrote his monograph on *Brickellia* (loc. cit.) he included *B. reticulata* as described above, but still reported the species doubtfully distinct. Its distribution was not exactly known and with only a poor print of the type specimen at his disposal he left Haenke's specimen as the only reference under that species name. Though Watson (Proc. Amer. Acad. XXII. 421, 1887), in giving the list of plants collected by E. Palmer in the State of Jalisco in 1886 included Palmer's no. 59a as *B. reticulata* with the note that it was a coarser and broader leaved plant than *B. oliganthes*, this specimen at the Gray Herbarium has been annotated by Robinson as "a robust form of *B. oliganthes*."

It has not been possible to compare this recently collected plant with the type in the herbarium at Geneva, but I have had the use of a recently made, improved print from the negative of it at the Gray Herbarium. While this photograph mostly shows a large inflorescence with only the uppermost leaves, comparison certainly suggests great likeness of the new specimen to it. Also additional information has been found concerning the time and region of Haenke's collections. At the Instituto de Biología in Mexico City, Prof. M. Martínez suggested that I could check on Haenke's travels in *Biblioteca Botánico Mexicana* by Dr.

Nicholas León, Mexico, 1895. There on page 323, in a brief account of Tadeo Haenke, the author referred to his visit to Mexico and thereafter followed the sentence (here translated). It seems that they arrived at Acapulco in November and returned to the same place in December. Five fascicles entitled "The Mexican Journey" and "Plants of Mexico" were the fruit of this exploration. The road from Acapulco to Mexico City would most assuredly lead through Cuernavaca and southwest from it. The road to Jautepec also goes south to Juitepec and then turns east. Thus Haenke would have made collections along a route less than twenty-three kilometers distant at Cuernavaca from the road beside which the recently collected plant grew.

Only four Mexican species of *Brickellia* were described by DeCandolle. The type specimens for two were Haenke's collections without exact location, Mendez' specimen for a third, and plants of both Haenke and Mendez were seen for a fourth. The three where Haenke specimens were involved are *B. reticulata*, *B. hebecarpa*, and *B. scoparia*, respectively. It is perhaps more than coincidental that although *B. hebecarpa* was not found, the related species *B. glomerata*, which was separated from it mostly on the basis of glomerulate heads, was most abundant at this location, and *B. scoparia* was found within seven kilometers' distance along the same road.

While in the author's collections alone, from three different localities in Michoacan, Jalisco and Morelos, plants were found that do match *B. oliganthes* (Less.) Gray, *B. verbenacea* (Greene) Robinson, and *B. reticulata* (DC.) Gray, as described by Robinson, it may be that the first of these three species should be reinvestigated. As shown by all specimens of *B. oliganthes* in the Gray Herbarium, there is quite a range of variation in the width and nature of the margin of the leaves, in the laxity of the inflorescences where the heads range from sessile to pedicellate. Also, since the step from acute inner to mucronate or acuminate outer involucre bracts is made within a single head, it is difficult to make a sharp distinction between this species and *B. verbenacea* by outermost bracts when a number of specimens are taken into account. The writer feels that many more collections of these plants, from the countries of Central America as well as Mexico, are necessary before any useful purpose would

be served in attempting the delimitation of *B. oliganthes*, the entity first described by Lessing (*Linnaea* V. 137, 1830) as *Eupatorium oliganthes*.

There are two other tomentose species of this subsection *Reticulatae*, *B. venosa* (Wooton & Standley) Robinson of northern Mexico and New Mexico, and *B. Kellermanii* Greenman of Guatemala. Both have smaller oblong to linear serrate leaves. In his introduction, Robinson referred to these two species and *B. reticulata* as being very close to *B. oliganthes* in technical characters. However, the plant collected as *B. reticulata* differs from both in its leaves and is known to vary cytologically from an accession of the latter from Arizona.

With the aid of cytological study of meiotic stages, the specimens collected matching both *B. oliganthes* and *B. verbenacea* showed regularity of division and clear metaphase plates of 9 chromosomes (figures in MS. in preparation). However, in *B. reticulata*, a regular plate at first metaphase could hardly be found due to an early dissociation of one or more pairs of bivalents. This kind of irregularity is sometimes associated with hybridization. In this may lie the explanation of the more rarely found tomentose plant with entire leaves.

Because plants in suitable stages for the study of meiosis, often do not have ripe seeds at the same time, it is not known whether this plant of *B. reticulata* would have been fertile. No achenes had matured on it. Where *B. oliganthes* occurred, there were several plants and it was possible to find two more advanced heads on another plant. Of *B. verbenacea*, Mr. Castillo of Guadalajara, who had been with me at the time of collection, obtained seeds by returning at a later time. Thus we know that both of these, as well as *B. venosa*, produced viable seeds. If the incidence of irregular meiosis favors an interpretation of hybridity, so too the size of the inflorescence of Haenke's collection, like the plant of my recent collection, might indicate hybrid vigor.—BIOLOGICAL LABORATORIES, HARVARD UNIVERSITY.

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PREPARING SPECIMENS OF PICEA AND TSUGA.—Preparation of good herbarium specimens of *Picea* and *Tsuga* requires special treatment to prevent the needles from shedding while drying in the plant press. A. J. Sharp (An improvement in the method of